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Indian Standard
SPECIFICATION FOR TRACTOR OPERATED DISC HARROWS

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SPECIFICATION FOR TRACTOR OPERATED DISC HARROWS

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AMENDMENT NO. 2 MAY 2002
TO
IS 6635 : 1972 SPECIFICATION FOR TRACTOR OPERATED DISC HARROW

(*Page* 10, *clause* 7.10) — Insert the following new clauses after **7.10**:

'**7.11** Loading platform shall be provided for adding the weights at the frame to assist penetration.

7.12 Notched discs should be mounted to the front gang and plain discs should be mounted to the rear gang for better pulverization of the soil.

7.13 Stabilizer assembly, mounted to the tractor, should be used during transportation of the harrow to avoid side swing during transportation.'

(FAD 59)

Reprography Unit, BIS, New Delhi, India

Indian Standard
SPECIFICATION FOR TRACTOR OPERATED DISC HARROWS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 17 July 1972, after the draft finalized by the Farm Implements and Machinery Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 With the increase in the number of tractors, tractor operated disc harrows are also being manufactured and used in large number in the country for preparation of seed beds. The need was, therefore, felt for an Indian Standard for introduction of uniform quality control practices in the manufacture of disc harrows. This standard specifies essential dimensions for disc harrows without freezing any design. The figures given in this standard are for illustration and for guidance only.

0.3 In the preparation of this standard assistance has been taken from the following:

GOST 10267-62 Tractor disc harrows. Committee of Standards, Measures and Measuring Instruments under Council of Ministers, USSR.

ASAE S. 290 'Determining the cutting width and the designated weight of disc harrows'. American Society of Agricultural Engineers, USA.

0.3.1 The manufacturing and trade practices prevailing in the country have also been kept in view while preparing this standard.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the material and requirements for the disc harrows operated by agricultural tractors.

---

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Harrow — An implement to break-up soil to a shallow depth to cut weeds and to mix materials into soil.

2.2 Disc Harrow — A harrow which performs the operations by means of a set or a number of sets of concave steel discs, each disc being mounted on a common shaft.

2.3 Single Action Disc Harrow — A disc harrow with two gangs placed end to end which throws the soil in opposite directions.

2.4 Double Action Disc Harrow — A disc harrow consisting of two or four gangs in which a set of one or two gangs follows behind the set of the other one or two (as the case may be) arranged in such a way that the front and back gangs throw the soil in opposite directions.

2.4.1 *Tandem Type* — A disc harrow comprising of four gangs in which each gang can be angled in opposite direction.

2.4.2 *Offset Type* — A disc harrow comprising of two gangs and capable of being offset to either side of the centre line of the tractor.

2.5 Trailed — Drawn by but not mounted on a tractor.

2.6 Mounted — Attached to three-point linkage of the tractor and to be carried by the tractor in the lifted position.

2.7 Frame — Rigid structure, on which the gangs are fitted.

2.8 Gang — Each set of concave discs, which is mounted on a common shaft and discs are separated by spool.

2.9 Concave Disc — A circular concave steel plate used for cutting and inverting the soil.

2.10 Spool — The flanged tube mounted on gang axle between every two discs to prevent the lateral movement of the disc on the shaft.

2.11 Gang Axle — A shaft, on which a set of concave discs are fitted.

2.12 Gang Angling Mechanism — A mechanism by means of which the gang angles are adjusted.

2.13 Scraper — A rigid or oscillating member which scrapes the soil adhering to the concave side of the disc.

2.14 Gang Angle — The angle between the axis of gang and the line perpendicular to the direction of motion.

2.15 Disc Spacing — The transverse distance between two adjacent disc edges. This can be obtained by adding thickness of one disc and length of a spool.

2.16 Width of Cut — The transverse distance between the top or bottom cutting edges of the end discs. For measuring the width of cut, gangs of the harrow shall be set at an angle of 18° (in case of offset type included angle of 36°).

2.17 Ground Clearance — The vertical distance between ground and the lower edge of the disc when the trailed harrow is supported on transport wheels.

3. TYPES

3.1 The disc harrows may be of the following types:

- a) Single Action — *see* Fig. 1:
  - 1) Mounted
  - 2) Trailed
- b) Double Action:
  - 1) Tandem — *see* Fig. 2:
    - i) Mounted
    - ii) Trailed
  - 2) Offset:
    - i) Mounted — *see* Fig. 3
    - ii) Trailed — *see* Fig. 4

4. SIZE

4.1 The size of the harrow shall be determined by the number and diameter of the discs and the width of cut. For size declaration, width of cut shall be calculated by the following formula:

a) For single action:

$$W = \frac{0{\cdot}95\ NS + 0{\cdot}3\ D}{1\ 000}$$

b) For tandem type:

$$W = \frac{0{\cdot}95\ NS + 1{\cdot}2\ D}{1\ 000}$$

c) For offset type:

$$W = \frac{0{\cdot}95\ NS + 0{\cdot}6\ D}{1\ 000}$$

where

W = width of cut (*see* **2.16**) in m,
N = number of disc spacing,
S = disc spacing (*see* **2.15**) in mm, and
D = diameter of disc in mm.

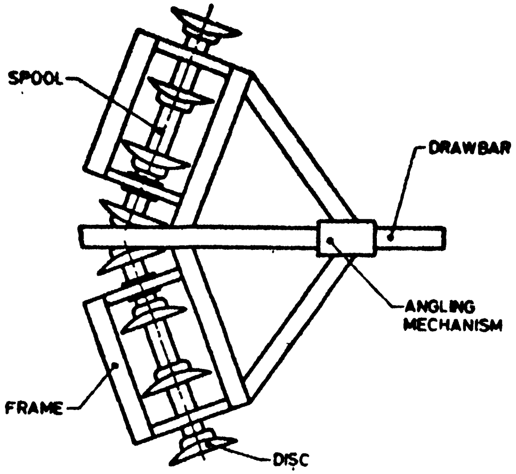

FIG. 1 DISC HARROW (SINGLE ACTION TYPE)

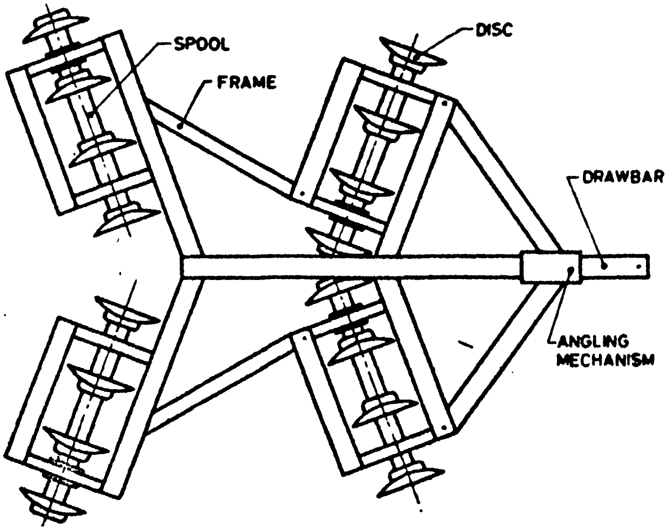

FIG. 2 DISC HARROW (TANDEM TYPE)

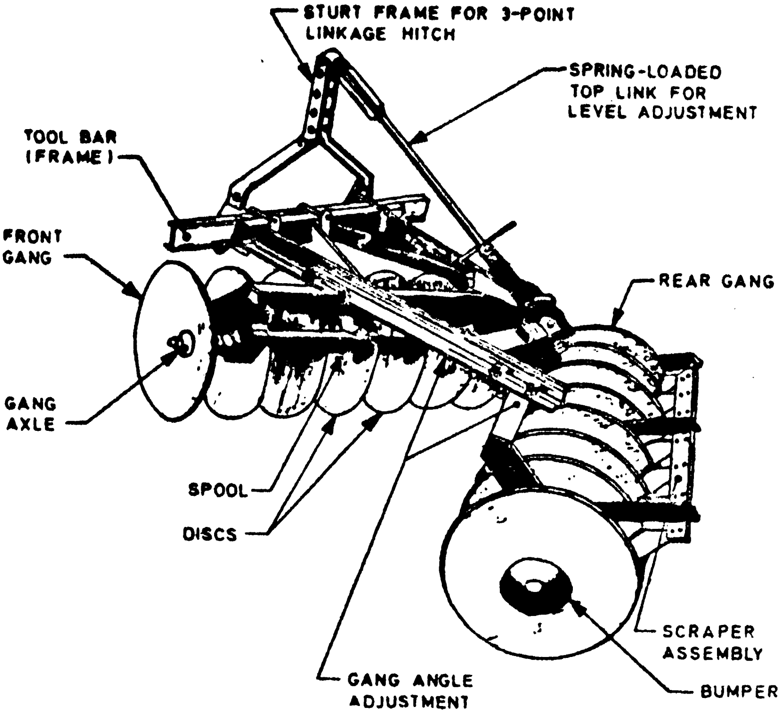

FIG. 3 DISC HARROW (OFFSET TYPE, MOUNTED)

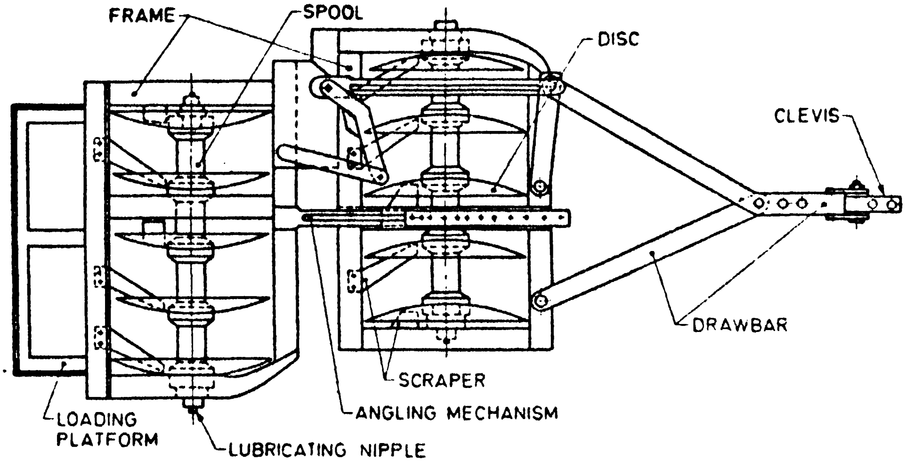

FIG. 4 DISC HARROW (OFFSET TYPE, TRAILED)

5. MATERIALS

5.1 The requirement of the materials used for different components of the disc harrow shall be as given in col 3 of Table 1. As far as possible, the material and its grade should conform to the standards as given in col 4 and 5 of Table 1.

TABLE 1 MATERIAL FOR DIFFERENT COMPONENTS OF DISC HARROW

Sl No. (1)	Name of Part (2)	Material (3)	Applicable Standard (4)	Grade (5)
i)	Frame	Mild steel	IS : 226-1969*	—
ii)	Gang axle	Mild steel	IS : 226-1969*	—
iii)	Spool	Cast iron	IS : 210-1970†	20
iv)	Scraper	Mild steel	IS : 226-1969*	—
v)	Gang angling mechanism	Mild steel	IS : 226-1969*	—
vi)	Transport wheel	Cast iron	IS : 210-1970†	20
		Mild steel	IS : 226-1969*	—
vii)	Loading platform, if provided	Mild steel	IS : 226-1969*	—
viii)	Drawbar/Hitch	Mild steel	IS : 226-1969*	—
ix)	Gang bearing	Cast iron	IS : 210-1970†	20
		Mild steel	IS : 226-1969*	—
x)	Hitch pin	Carbon steel	IS : 1570-1961‡	C_{40}
xi)	Disc	Carbon steel	IS : 1570-1961‡	C_{75}

*Specification for structural steel (standard quality) (*fourth revision*).

†Specification for grey iron castings (*second revision*).

‡Schedules for wrought steels for general engineering purposes.

6. ESSENTIAL REQUIREMENTS

6.1 The disc harrow shall fulfil the following requirements:

a) Number of gangs — Two (in case of offset and single action) and four (in case of tandem type);

b) Type of disc — Plain or notched;

c) Number of disc — Minimum four (in each gang);

d) Disc size — 455 to 660 mm. For four disc gang, the size of disc should be not more than 610 mm;

e) Length of spool — 175 or 225 ± 2 mm;

f) Gang angle — Up to 24° (in each gang); and

g) Ground clearance (*see* **2.17**) — 125 mm.

7. OTHER REQUIREMENTS

7.1 Discs — The discs used in harrow shall conform to all the requirements as stipulated in IS : 4366 (Part I)-1972*.

7.1.1 The cross-sectional size of gang axle shall be in accordance with provisions given in IS : 4366 (Part I)-1972*.

7.1.2 Hole size in spool shall be in accordance with gang axle size.

7.2 Frame — The frame should be rigid and strong.

7.3 Gangs — The gangs should be so attached that their angles can be easily changed to desired position with gang angling mechanism.

7.3.1 The rear gang(s) in offset and tandem type harrows should be so arranged that the discs of rear gang(s) should not make the same path formed by front gang(s).

7.3.2 Bumpers may be provided in the inside end of the front gangs of the single action and tandem harrows to prevent the inside discs from rubbing each other at any gang angle at which the gangs are set.

7.3.3 The discs (in each gang) of the assembled harrow shall be firmly fixed among themselves by spools and there should not be any relative movement between disc and axle.

7.4 Scrapers — The scrapers should be set in such a way that they should not touch the face of disc and should be able to scrape the soil effectively. Arrangement for adjusting the scrapers shall be made.

7.5 Bearings — Adequate arrangement for lubrication of bearings shall be provided. The bearings should be reasonably dust-proof and shall be properly aligned.

7.6 Spool — The plain spool shall conform to IS : 7230-1974§.

7.7 In trailed type harrows transport wheels may be provided for transportation of harrow from one place to other.

7.8 In trailed type harrows, the drawbar should be manufactured in such a manner that it should conform to the requirements of tractor drawbar as given in IS : 4931-1968†.

7.9 In mounted type harrows, dimensions of hitch points should be such that they should conform to the requirements of three-point linkage as given in IS : 4468-1967‡.

---

*Specification for agricultural tillage discs: Part I Concave type (*first revision*).

†Specification for power take-off shafts of agricultural tractors.

‡Dimensions for three-point linkage of agricultural wheeled tractors.

§Specification for plain spool for tractor operated disc harrows.

7.10 Operational and maintenance manuals and set of tools including adjustable wrench and grease-gun should be provided.

8. FINISH AND WORKMANSHIP

8.1 The discs shall be finished as specified in IS : 4366 (Part I)-1972*.

8.2 The welding of the various parts shall be satisfactory in all respects (*see* **7.1** of IS : 822-1970†).

8.3 The components should be free from pits, burrs and other visual defects.

8.4 The exposed metallic parts shall be free from rust and shall have a protective coating which will prevent surface deterioration in transit and storage.

9. MARKING AND PACKING

9.1 Marking

9.1.1 Each disc harrow shall be marked with the following particulars:

a) Manufacturer's name and trade-mark, if any;
b) Type and size; and
c) Batch or code number.

9.1.1.1 These particulars shall be stamped, embossed or engraved on metallic plate and rigidly fitted on a non-wearing part of the disc harrow.

9.1.2 Each disc harrow may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9.2 Packing — The disc harrow should be packed to ensure safety of the parts in transportation as agreed to between the manufacturer and the purchaser.

10. SAMPLING AND CRITERIA FOR CONFORMITY

10.1 Unless otherwise agreed to between the purchaser and the supplier, the method of sampling scheme and criteria for conformity given in Appendix A shall be followed.

---

*Specification for agricultural tillage discs: Part I Concave type (*first revision*).

†Code of procedure for inspection of welds.

APPENDIX A

(*Clause* 10.1)

SAMPLING SCHEME AND CRITERIA FOR CONFORMITY OF DISC HARROWS

A-1. SCALE OF SAMPLING

A-1.1 Lot — In any consignment all the disc harrows of the same shape and size and manufactured from the same materials under relatively similar conditions of manufacture shall be grouped together to constitute a lot.

A-1.2 For ascertaining the conformity to this specification, the test shall be carried out separately for each lot.

A-1.3 The number of disc harrows to be sampled from a lot for ascertaining the conformity to the requirements of this specification shall be according to col 2 of Table 2.

TABLE 2 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES OF DISC HARROWS

(*Clauses* A-1.3, A-2.1 *and* A-2.2)

No. in a Lot	For Visual and Dimensional Tests (*see* Clauses 6 and 8)		For Other Tests (*see* Clause 7)	
	Sample Size	Permissible No. of Defectives	Sample Size	Permissible No. of Defectives
(1)	(2)	(3)	(4)	(5)
Up to 100	5	0	2	0
101 „ 300	13	1	3	0
301 „ 500	32	3	5	0
501 „ 1 000	50	5	8	1
1 001 and above	80	7	13	1

A-1.3.1 The disc harrows shall be selected at random from the lot. To ensure the randomness of selection a random number table (*see* IS : 4905-1968*) as agreed to between the purchaser and the supplier shall be used. In case such a table is not available, the following procedure shall be used:

---

*Methods for random sampling.

> Starting from any disc harrow, count them as 1, 2, 3,..., up to r and so on in one order where r is the integral part of N/n (N being the number of disc harrows in the lot and n the number of disc harrows to be selected). Every rth disc harrow thus counted shall be withdrawn to give the required number of disc harrows in the sample.

A-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-2.1 Tests for Visual and Dimensional Characteristics — The disc harrows selected at random according to **A-1.3.1** shall be examined for the visual and dimensional characteristics (*see* **6** and **8**). The disc harrows failing to satisfy any one or more of these requirements shall be regarded as defective. The lot shall be considered as conforming to the requirement for these characteristics, if the number of defective disc harrows in the sample does not exceed the number given in col 3 of Table 2.

A-2.2 Tests Other Than Visual and Dimensional — If the lot conforms to the requirements for visual and dimensional characteristics (*see* **A-2.1**), a sub-sample of size given in col 4 of Table 2 shall be taken from the disc harrows selected in **A-1.3.1**. Each of the disc harrows in the sub-sample shall be tested for the requirements of characteristics other than visual and dimensional (*see* **7**). A disc harrow not satisfying any one or more of these requirements shall be regarded as defective. The lot shall be considered to conform to these requirements, if the number of defectives in the sub-sample does not exceed the number given in col 5 of Table 2.